

**Neogene donaciine fossils from Tamaniwa district, Yamagata
Prefecture, Japan, with description of a new species
(Coleoptera: Chrysomelidae: Donaciinae)**

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山形県玉庭地域の新第三系から産出したネクイハムシ亜科の化石
(鞘翅目：ハムシ科)

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抄録：山形県南部の米沢盆地西縁に分布する新第三系より3種のネクイハムシ亜科の化石を得た。上部中新統の高峰層からは絶滅種の *Plateumaris* 属および *Donaciomima* 亜属が産出し、前者を前胸背板の特徴に基づき新種タカミネミズクサハムシ *Plateumaris kinugasana* sp. nov.として記載した。鮮新統の手ノ子層からは絶滅種のブシミズクサハムシ *Plateumaris dorsata* Hayashi が産出した。

Abstract: Three species of donaciine fossils were obtained from the Neogene in Tamaniwa district, western marginal part of the Yonezawa Basin, Yamagata Prefecture, Japan. The Upper Miocene Takamine Formation yields two species, extinct *Plateumaris* sp. and *Donacia* (*Donaciomima*) sp. The former is described as a new species, *Plateumaris kinugasana* sp. nov., which is characterized by smooth pronotal disc. The Pliocene Tenoko Formation yields an extinct species, *Plateumaris dorsata* Hayashi.

Key Words: Donaciinae; extinct species; fossil; new species; Miocene; Pliocene; *Plateumaris kinugasana*

This paper reports on the donaciine fossils from the Neogene Takamine and Tenoko Formations in Tamaniwa district, western marginal part of Yonezawa Basin, Yamagata Prefecture, Japan. I recognized three species including a new *Plateumaris* from these fossils. In Japan, the Neogene donaciine fossils are poorly known. The Hôgi Lignite Formation in Tottori Prefecture is the only locality that occurs abundant donaciine fossils (Fossil Insect Research Group for Nojiri-ko Excavation and Akagi, 1986), but its detail age and stratigraphic position is undetermined. Therefore, this paper is the second report of the Neogene donaciine fossils from Japan and first description of a Late Miocene *Plateumaris* in Japan. These fossil records suggest that extinct species existed in Eastern Honshu during Neogene.

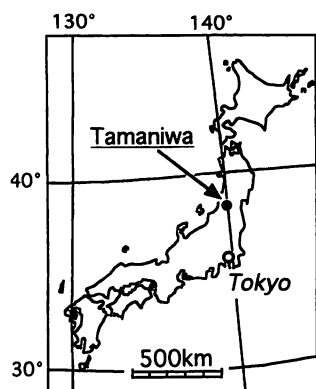


Fig. 1. Index map of the studied area.

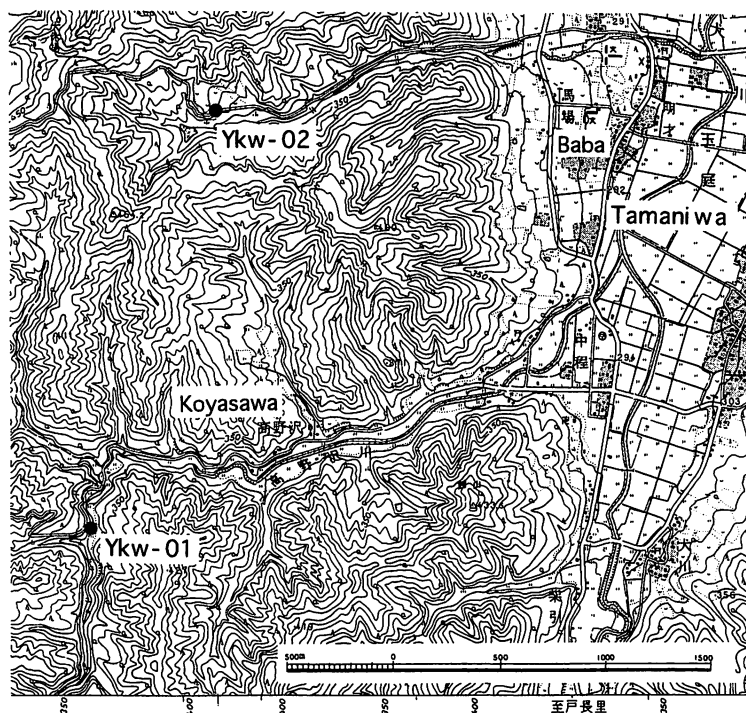


Fig. 2. Locality map of donacine fossils from Tamaniwa district. Modified from the topographical map "Tamaniwa", scale 1: 25,000 by the Geographical Survey Institute, Japan.

Yanagisawa and Yamamoto (1998) reviewed the geology of the Neogene in this and subdivided the Neogene sedimentary into the Kitaoguni, Meganebashi, Myozawabashi, Numazawa, Yugoya, Utsutoge, Takamine, Tenoko, and Nakahara Formations in ascending order. The Takamine, Tenoko, and Nakahara Formations are represented by freshwater sediments (Yanagisawa and Yamamoto, 1998) and rich in plant remains (e. g. Uemura, 1988; Tsukagoshi and Suzuki, 1990). The Takamine Formation is composed of meandering river deposits and marsh deposits and assigned to the Late Miocene to Early Pliocene (Yanagisawa and Yamamoto, 1998). The Tenoko Formation is characterized by meandering river deposits and assigned to the late Early Pliocene to early Late Pliocene (Yanagisawa and Yamamoto, 1998).

The specimens described below were obtained from two localities as shown below at Kawanishi-machi, Higashiokitama-gun, Yamagata Prefecture (Figs. 1-3).

Ykw-01 ($37^{\circ} 55' 24''$ N; $139^{\circ} 57' 27''$ E; alt. 360 m). Lower part of the Takamine Formation is exposed in riverbed of the Koyasawa River. Fossil beetles were obtained from thin peaty silt bed.

Ykw-02 ($37^{\circ} 56' 29''$ N; $139^{\circ} 57' 51''$ E; alt. 320 m). Upper part of the Tenoko Formation is exposed in roadside between Baba and Yanosawa. Fossil beetles were obtained from lignite bed.

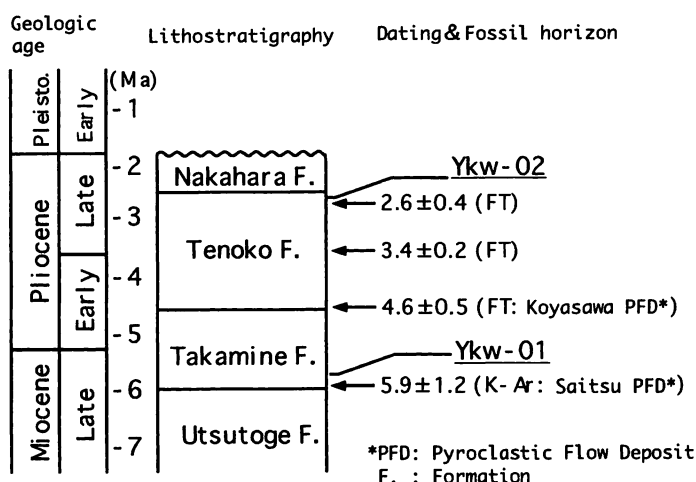


Fig. 3. Stratigraphy and fossil horizon of Tamaniwa district (modified after Yanagisawa and Yamamoto, 1998).

The study followed the method of Hayashi (1999a). All fossil specimens reported in this paper are deposited in the Osaka Museum of Natural History (OMNH). For comparison, recent specimens from both in OMNH and in the author's collection were used.

Descriptions of fossils

Subfamily Donaciinae Kirby

Genus *Plateumaris* Thomson

Plateumaris kinugasana sp. nov.

(Japanese name: Takamine-mizukusa-hamushi)

(Fig. 4)

Diagnosis. Pronotum cordate in shape; disc lacks coarse punctures and rugae therefore shiny, with microsculpture almost over disc.

Description. Coloration of pronotum, elytron, sterna of thorax and abdomen entirely metallic green, sometimes black. Pronotum more or less cordate; anterolateral calli prominent, callosal sulci somewhat deep; disc entirely smooth and shiny with microsculpture almost over disc; basal sulcus present without rugae; median line indistinct. Elytron with 10 complete punctate striae and a scutellar striole; sutural interval entirely rugose, narrowed subapically, inner and outer beads convergent, and explanate sutural margin exposing; other intervals with transverse rugae between them, getting finer and denser apically; apex rounded. Pygidium punctate; male pygidial apex shallowly emarginate.

Measurements. Pronotum: length, 1.3-1.5 mm (n=5). Elytron: length, 4.4 mm; width, 1.4 mm (n=1).

Type series. Holotype (OMNH TI-130) and 7 paratypes (in collection of the Osaka Museum of Natural History, Nagai Park 1-23, Higashi-sumiyoshi-ku, Osaka, 546-0034 Japan).

Type locality. Ykw-01 (Takamine Formation).

Remarks. The genus *Plateumaris* comprises 17 Nearctic and 9 Palaearctic recent species. Askevold (1991) arranged them into five species groups by phylogenetic analysis as follows: {(*P. braccata* G. + *P. rufa* G.) + [*P. pusilla* G. + (*P. shoemakeri* G. + *P. nitida* G.)]}. All members of the genus possess punctures and/or rugae on pronotal disc but the new species lacks these features. The new species belongs to the (*P. braccata* + *P. rufa*)-groups based on cordate pronotum and shiny pronotal disc, but its detail position is not determined because the fossil specimens lack useful characters for classification (e. g. hind leg, ovipositor, male genitalia, etc.). *Plateumaris constricticollis* (Jacoby) of Japan and *Plateumaris rufa* (Say) of North America are similar to the new species but they possess sparsely coarse punctures on pronotal disc.

Etymology. The specific name of the new species is dedicated to the late Mr. Hironao Kinugasa, a Palaeoentomologist in Tottori Prefecture. He used to study fossil insects from the Neogene and Quaternary sediments in San'in district, Western Japan (e. g. Kinugasa and Miyatake, 1976; 1979).

***Plateumaris dorsata* Hayashi**

(Figs. 5A-5C)

Plateumaris dorsata Hayashi, 1997, p. 362 (original description)

Plateumaris dorsata: Hayashi, 1999b, p. 40 (revision)

Description. Coloration of head, pronotum, elytron and sterna of abdominal segment entirely metallic green. Vertex of head densely and coarsely punctate. Pronotum more or less quadrate; disc sparsely punctate, posterior swollen area with microsculptures rather densely and uniformly, very finely reticulate appearing to be granulate, sometimes only punctulated; median line indistinct, sometimes distinct; basal sulcus present but shallow, punctures coarse and sparse; callosal sulcus broadly furrowed; anterolateral callus prominent. Elytral disc with ten complete punctate striae and a scutellar striole; interstriae shiny; interstitial rugae entirely distributed, radiating from striae punctures, getting finer and denser apically; sutural interval narrowed subapically, inner and outer beads convergent, and explanate sutural margin exposing; apex rounded.

Measurements. Pronotum: length, 1.3-1.8 mm (n=4). Elytron: length, 4.1-5.4 mm; width, 1.2-2.0 mm (n=2).

Specimens examined. Seven specimens from the Tenoko Formation at Ykw-02.

Remarks. *P. dorsata* was described from the Lower Pleistocene Bushi Formation in Iruma City, Saitama Prefecture, Japan (Hayashi, 1997). This occurrence from the Tenoko Formation is the second and oldest fossil record of this species.

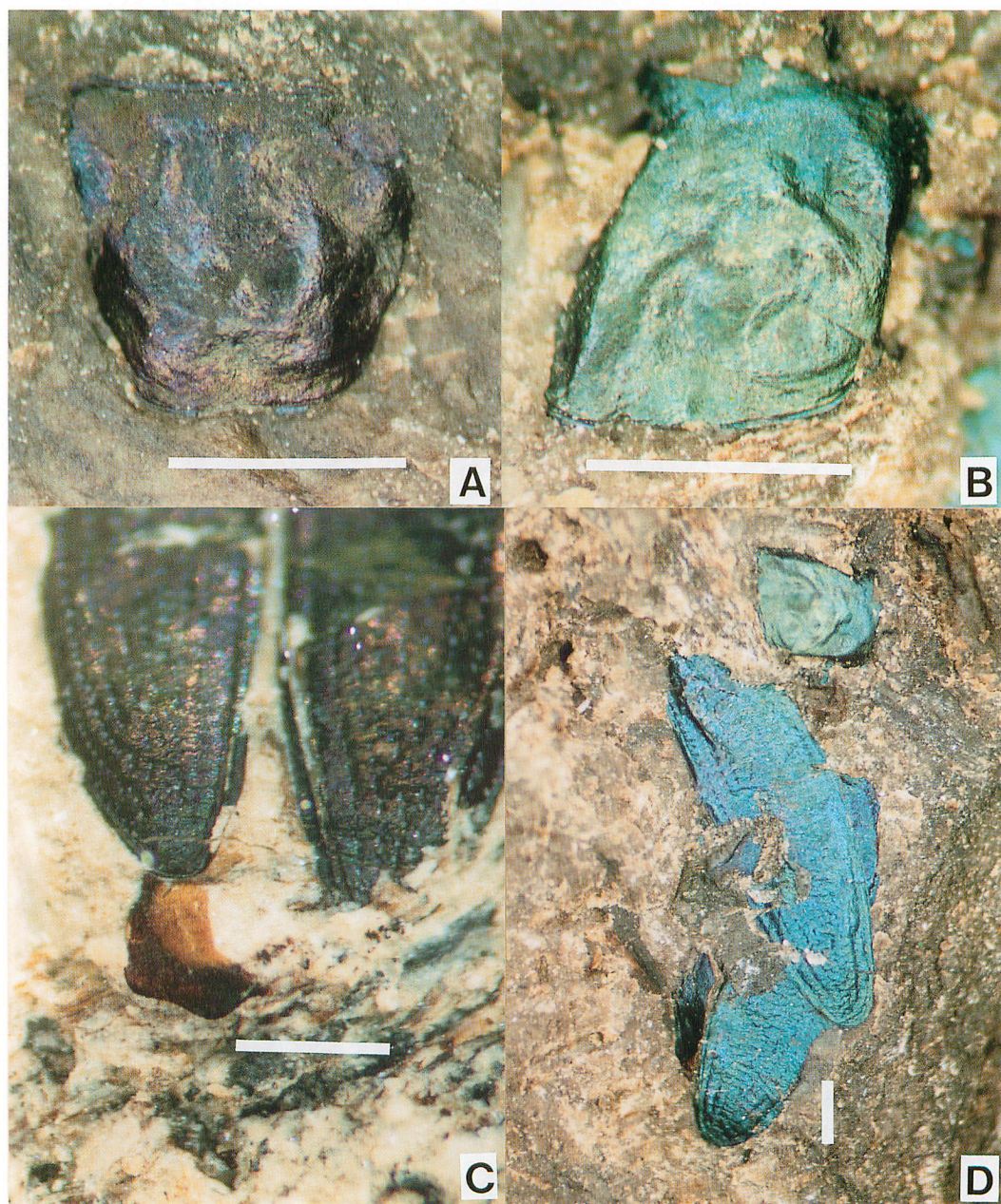


Fig. 4. *Plateumaris kinugasana* sp. nov. from Ykw-01: A-B, pronota; C, elytral apices and pygidium of male; D, pronotum and elytra. A, Holotype (OMNH TI-130); and others, paratypes. Scale bar = 1.0 mm.

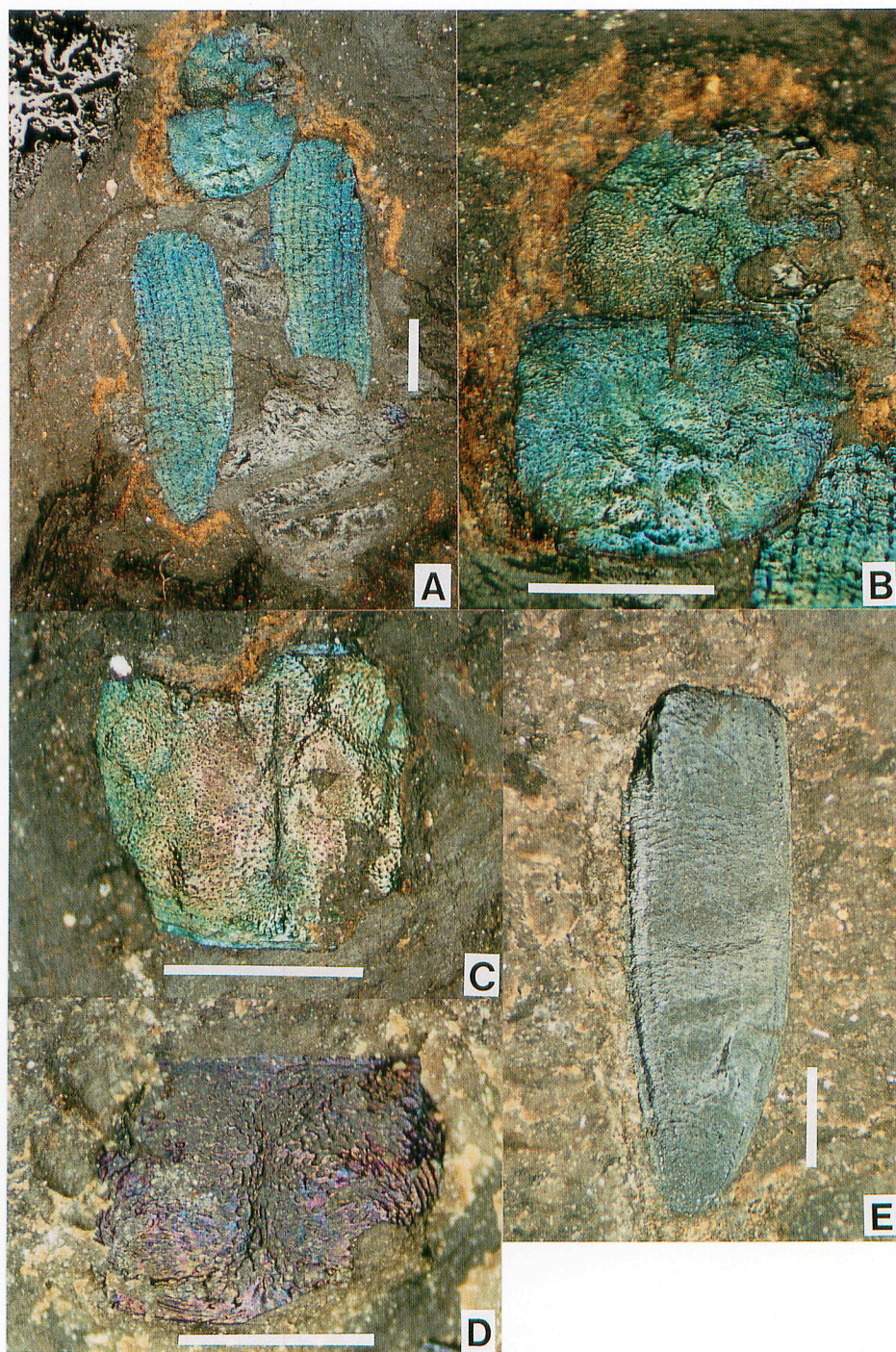


Fig. 5. A-C, *Plateumaris dorsata* from Ykw-02: A, head, pronotum, elytra, and abdominal segment; B, head and pronotum; C, pronotum. D-E, *Donacia* (*Donaciomima*) sp. from Ykw-01: D, pronotum; E, left elytron. Scale bar = 1.0 mm.

Genus *Donacia* Fabricius
Subgenus *Donaciomima* Medvedev
***Donacia* (*Donaciomima*) sp.**
(Figs. 5D-5E)

Description. Coloration of pronotum and elytron metallic. Pronotum more or less quadrate; median line indistinct; callosal sulcus present but shallow; disc coarsely punctured with transverse rugae; discal puncture oval, more or less oblong; basal sulcus shallow. Elytron subparallel-sided from base to middle, gradually narrowed toward apex, with ten complete punctate striae and a scutellar striole; stria punctures nearly vertical oval; all intervals shiny, rugulose, punctulate; sutural interval gradually narrowing to apex; other intervals with transverse rugae between them; apex truncate, outer and inner apical angles nearly right.

Measurements. Pronotum: length, 1.4 mm (n=1). Elytron: length, 5.5 mm; width, 1.7 mm (n=1).

Specimens examined. Two specimens from the Takamine Formation at Ykw-01.

Remarks. This species resembles *Donacia splendens* Jacobson and its allies on pronotal and elytral features, but their identification needs to examine their endophallus of male genitalia.

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